Appendix A
Existing Data Quality and Usability Assessment—Midland Area Soils

APPENDIX A

Existing Data Quality and Usability Assessment – Midland Area Soils

This appendix documents the quality and usability of existing data for possible use in remedial investigation (RI) decision making. The following items are addressed in this appendix:

- Sources of analytical data incorporated into the Midland Offsite Corrective Action (MOCA) database
- Criteria used to assess the quality of the existing data sets and development of data usability categories for RI planning and data evaluation activities
- Results of the categorization process

Data Sources

A number of environmental studies and data collection activities have been completed in the city of Midland, Tittabawassee River, and Saginaw River areas since the 1970s. The purposes of these investigations varied, ranging from general characterization of sediment for dredge spoil disposal to preliminary assessments of risk posed by human exposure to hazardous substances in soil. The analytical data for a number of these studies and monitoring efforts were incorporated into the analytical database created to support The Dow Chemical Company (Dow), Michigan Operations, MOCA Program. In addition, the results of the 2006 data collection effort to support a possible bioavailability study of Midland area soils were added to the database.

The following data sources include results for samples obtained in the vicinity of the Midland Soils Study Area:

- *Point Sources and Environmental Levels of 2378-TCDD (2,3,7,8-Tetrachlorodibenzo-p-Dioxin) on the Midland Plant Site of The Dow Chemical Company and in the City of Midland, Michigan* (Agin, R.J., V.A. Atiemo-Obeng, W.B. Crummett, K.L. Krumel, L.L. Lamparski, T.J. Nestrick, C.N. Park, J.M. Rio, L.A. Robbins, S.W. Tobey, D.I. Townsend, and L.B. Westover, November 1984)
- *Soil Screening at Four Midwestern Sites* (U.S. Environmental Protection Agency [USEPA], Region 4, June 1985)
- *Summary of 1996 Midland Dioxin Study Results, 3/25/97 Working Draft of Document for Public Release* (Michigan Department of Environmental Quality [MDEQ], Waste Management Division, March 1997)
- *Soil Sampling Summary Report* (Revised; Dow, March 2000)

- *Data Evaluation Report in Support of Bioavailability Study, Midland Area Soils* (CH2M HILL, March 2007)

Information about surface soil samples collected by MDEQ at the Midland Plant in 2005 was derived from data tables provided by Dow, and copies of analytical reports from Severn Trent Laboratories (Austin, Texas) and Eno River Laboratories (Durham, North Carolina).

Data Quality and Usability Criteria and Categories

Given the varied purposes of the above-listed investigations and the period in which some of the samples were collected, it is unlikely that these analytical data, now contained in the MOCA database, are of equivalent quality from an analytical perspective. A consistent process was employed to assess the overall quality of the historical data sets and to gauge their usability for remedial investigation decision making. This process consisted of reviewing all available documentation from the different investigation sources listed in the MOCA database, assessing its quality, and assigning a data usability category to the analytical data associated with the investigation sources.

Environmental data and reports associated with samples collected in the Midland area were identified and obtained from various sources, including Dow, Dow contractors, MDEQ, Michigan State University, the U.S. Army Corps of Engineers, and USEPA. As indicated in Table A-1 (at the end of this appendix), certain reports associated with older data could not be located or were incomplete.

Analytical data contained in the reports, work plans, and other documents were then assessed for quality using established USEPA criteria and guidelines for data quality, including information from the *Contract Laboratory Program National Functional Guidelines for Inorganic/Organic Data Review* (USEPA, 2004). The assessment considered the quality assurance/quality control (QA/QC) characteristics of the entire analytical data set associated with a data source, and did not include detailed QA/QC screening or validation of individual data points. The primary parameters used to review the quality of the data and establish categories of data usability were as follows:

- Traceability – Was chain-of-custody (COC) information available, complete, and attached to the report or supporting documentation package? Absence of COC information was not cause for rejection of the data set. If documentation other than COC was available, professional judgment was used to establish traceability. For example, references to the COC form in the text of a report or other documentation consistent with standard practices were sufficient to document traceability.
- Comparability – Were the analytical procedures or methods and detection limits identified and do they represent the accepted industry standards at the time the samples were collected? Data sets more than 10 years old were downgraded to a less usable category because of possible detection limit concerns and possible changes in hazardous constituent concentrations over time.
- Sample Integrity – Were sample holding times met? Did the sample, as received by the analytical laboratory, meet pertinent and published guidance (for example, temperature criteria, adequate sample volume, appropriate methods of preservation)?

- QA/QC – Were laboratory QC data available to assess accuracy and precision and were these data within established control limits? Following are some typical laboratory QC parameters used to assess accuracy and precision:
  - Initial and continuing calibration
  - Instrument tuning for organic compound (gas chromatography/mass spectroscopy) measurements
  - Internal standards for organic compound measurements
  - Interference checks, serial dilutions for metals measurement
  - Laboratory blank sample measurements
  - Accuracy and precision measurements, to include surrogates for organics, laboratory control standards, matrix spikes, matrix spike duplicates, and duplicates for metals
  - Laboratory-specific method detection levels and associated procedures
  - Field QC samples, including blanks and replicates

The data associated with each investigation source were then assigned one of the following categories based on the finding of the review:

- **Category 1 – Data of Known Quality.** These are data that are supported by QA/QC protocols and sampling procedures described in work plans or investigation reports, but not equivalent in scope or detail to the current quality assurance project plan (CH2M HILL, 2004). Data from sources assigned to Category 1 can be used for most RI planning and may be incorporated into RI data evaluation groups if specific analytes, detection limits, and sample locations meet the data quality objectives for specific end uses.
- **Category 2 – Data of Partially Known Quality.** These are data associated with a limited body of supporting QA/QC information. Although not sufficient to be considered Category 1, the information is considered suitable for qualitative use in RI planning.
- **Category 3 – Data of Unknown Quality.** These data include sample concentration information but lack an adequate level of supporting QA/QC information. These data sets are not considered suitable for quantitative RI uses; however, depending on the reputability of the data sources, these data sets may be used on a limited or provisional basis for qualitative comparisons with other Category 1 and Category 2 data sets.

Data Usability Category Findings

The findings of the data usability evaluation for each Midland area data source are detailed in Table A-1. This table lists the investigating agency, associated report title, MOCA database source number, media type, analytical parameters, investigation timeline, QA/QC information used in the assessment process, and assigned usability category associated with each data source. Data usability findings for any data source may be changed if additional supporting information becomes available for review.

References

CH2M HILL. 2004. Quality Assurance Project Plan. April.

U.S. Environmental Protection Agency (USEPA). 2004. Contract Laboratory Program National Functional Guidelines for Inorganic/Organic Data Review.

TABLE A-1
Historical Data Quality and Usability Assessment Summary – Midland Area

Study Year	Author	Associated Report Name	MOCA Database Data Source Number	Data Source Name	Media	Analytical Parameters	Available QA/QC Data and/or Documents	Assigned Quality and Usability Assessment Category
2007	CH2M HILL	Data Evaluation Report to Support Bioavailability Study, Midland Area Soils	None	Pre-RI Study	Soil	Dioxins and furans SVOCs, VOCs Metals PCBs Pesticides Soil parameters (grain size distribution, TOC, black carbon, and specific surface area)	Analytical data table provides reporting limits, surrogate recovery information, and results for all samples, including results for field duplicate, lab blank, equipment blank, temperature blank, and trip blank samples. Laboratory reports provide analytical narratives and QC information.	Category 1 Data of Known Quality
2005	MDEQ	None	None	2005 Split Sampling with MDEQ, Surface Soils	Soil	SVOCs, VOCs Dioxins and furans Metals PCBs Pesticides	Analytical data table provides reporting limits, surrogate recovery information, and results for all samples, including results for field duplicate, lab blank, field blank, and trip blank samples. Laboratory reports provide analytical narratives and QC information.	Category 1 Data of Known Quality
1998	Dow	Michigan Operations Soil Sampling Summary Report (March 2000)	15	Dow Chemical Company 1998 Soil Sampling Summary	Soil	Dioxins and furans	The planning document, Appendix B, "Soil Sampling Work Plan" (September 1998), provides information on sample tracking procedures (although no COC documents are attached in the final report). Appendix C, "Analytical Report," contains a discussion on analytical procedures and methods; detection limits are reported with the raw data. The associated report contains discussions on sample holding times, temperature criteria, preservation methods, and sample preparation. QC data (field duplicate, method blank, matrix spike and recovery) were available to assess accuracy and precision.	Category 1 Data of Known Quality
1996	MDEQ, Waste Management Division	Summary of 1996 Midland Dioxin Study Results, 03/25/97 Working Draft of Document for Public Release (March 1997)	14	MDEQ Summary of 1996 Midland Dioxin Study Results	Soil	Dioxins and furans	No information is available on sample traceability, analytical procedures and methods, detection limits, or QC sample data.	Category 3 Data of Unknown Quality
1985	USEPA Region IV	Study of Dioxin and Other Toxic Pollutants, Midland, Michigan (April 1985)	4	1985 USEPA Study	Soil	Dioxins and furans PCBs Pesticides	No information is available on sample traceability, analytical procedures and methods, detection limits, or QC sample data.	Category 3 Data of Unknown Quality
1984	Dow Agin, R.J., V.A. Atiemo-Obeng, W.B. Crummett, K.L. Krumel, L.L. Lamparski, T.J. Nestrick, C.N. Park, J.M. Rio, L.A. Robbins, S.W. Tobey, D.I. Townsend, and L.B. Westover	Point Sources and Environmental Levels of 2378-TCDD on the Midland Plant Site of The Dow Chemical Company and in the City of Midland, Michigan (November 1984)	13	Dow 1984 Point Sources and Environmental Levels of 2378-TCDD on the Midland Plant Site of Dow and in the City of Midland, Michigan	Soil	Dioxins and furans	The associated report provides information on analytical documentation and records retention (although no COC documents are attached in the final report). The analytical appendix contains a discussion on analytical procedures and methods.	Category 2 Data of Partially Known Quality (note age of data)

Notes:
SVOC – semivolatile organic compound
PCBs – polychlorinated biphenyl
TOC – total organic carbon
VOC – volatile organic compound